**Department of Energy****Ohio Field Office
Fernald Area Office****P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155**

JUN 24 1997

DOE-1092-97

**Mr. David A. Kee, Director
c/o Mike Murphy
Air & Radiation Division
U.S. Environmental Protection Agency
Region 5 - A-18J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590**

Dear Mr. Kee:

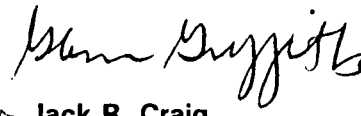
**1996 NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS ANNUAL
REPORT FOR THE FERNALD ENVIRONMENTAL MANAGEMENT PROJECT**

Enclosed is the Calendar Year 1996 National Emissions Standards For Hazardous Air Pollutants (NESHAP) Annual Report, required by 40 CFR 61.94(a), for the Fernald Environmental Management Project (FEMP). Enclosed with the report are the CAP88-PC files used to assess the annual dose.

This report estimates an Effective Dose Equivalent (EDE) to the Maximally Exposed Individual (MEI), using 1996 site meteorological data, of 0.66 millirem (mrem), as compared to the NESHAP Subpart H standard of 10 mrem.

If you have any questions, please contact Ed Skintik at (513) 648-3151.

Sincerely,


for Jack R. Craig
Director

FEMP:Skintik

Enclosures: As stated

cc w/enc (annual report only):

P. J. Sturdevant, HC-DOES
T. Tucker, OEPA-Columbus
AR Coordinator, FDF, 78

cc w/o enc:

S. M. Beckman, FDF, 65-2

U.S. Department of Energy
Radionuclide Air Emissions Annual Report
(under Subpart H of 40 CFR Part 61)
Calendar Year 1996

Site Name: Fernald Environmental Management Project (FEMP), Fernald, Ohio

Field Office Information:

Office: Fernald Area Office (FN), U. S. Department of Energy

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Cincinnati, Ohio 45253-8705

Contact: Mr. Ed Skintik

Phone: (513) 648-3151

Site Information

Operating

Contractor: Fluor Daniel Fernald

Address: 7400 Willey Road

Fernald, Ohio 45030 (Site location)

Post Office Box 538704

Cincinnati, Ohio 45253-8704 (mailing address)

Contact: Kip Klee

Phone: (513) 648-5289

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SUMMARY

For CY-1996 twenty-three radionuclide emission sources were identified as being subject to the reporting requirements of 40 CFR 61, Subpart H. The overall dose to the maximally exposed individual (MEI) is estimated to be 0.66 mrem (0.0066 mSv) which is in compliance with the Subpart H standard of 10 mrem. Of this dose, 0.046 mrem (0.00046 mSv) came from point sources and 0.61 mrem (0.0061 mSv) came from diffuse sources.

SECTION I: FACILITY INFORMATION

A. Site Description

The Fernald Environmental Management Project (FEMP) is located on a 425 hectare (1050 acre) area approximately 27 km (17 miles) northwest of Cincinnati, Ohio. The Production area covers approximately 136 acres (55 hectares) in the center of the FEMP. The facility is sited just north of the small farming community of Fernald, Ohio.

The area immediately surrounding the FEMP is primarily rural in nature, characterized by the predominance of agriculture, with some light industry and private residences. The FEMP is located on a relatively level plain, outside of the 500-year flood plain of the Great Miami River, in an ancestral river valley known as the New Haven Trough.

The climate is characterized as continental, with average temperatures ranging from approximately 29°F (-1.7°C) in January, to 76°F (24.4°C) in July. Average annual precipitation is approximately 40 inches (102 cm) per year. Prevailing wind flow is from the south-southwest.

For 37 years, the former Feed Materials Production Center (Fernald site) produced uranium metals for the United States Department of Energy (DOE) and its predecessors. On July 10, 1989, uranium metals production was suspended. Management responsibilities of the Fernald site were transferred from the Defense Programs organization to the DOE's Office of Environmental Restoration and Waste Management.

Currently, most activities at the FEMP are conducted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). These activities include sample analysis, waste characterization, the management, treatment, storage, and disposal of hazardous, mixed, low-level and solid wastes, and the decontamination and cleanup of radioactively contaminated buildings, equipment, soils, and waters. The site also manages thorium wastes, and K-65 silo waste material which contains radium and produces radon gas.

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B. Source Descriptions

The majority of the radioactive contamination at the FEMP is due to uranium, uranium compounds, and thorium. Additional contamination comes from the daughter products of uranium and thorium.

Calendar year 1996 (CY-1996) radionuclide emission sources at the FEMP include:

- Plant 1: Fugitive emissions from cleanup activities in preparation of implosion of the Plant 1 building;
- Plant 4: Fugitive emissions from cleanup activities and implosion of the Plant 4 building;
- Plant 5: Fugitive emissions from segregation and repackaging operations;
- Plant 6: Emissions from repackaging operations;
- Plant 8: Radionuclide releases via entrainment in mists generated during vacuum filtration operations; General Ventilation (2 vents) during periods of vent fan operation;
- Building 11: Emissions from the laundry facilities resulting from the processing of contaminated clothing used at the FEMP, and from the Respirator Washing Facility located in the building;
- Building 15: Emissions from laboratory operations;
- Building 20: Emissions resulting from laboratory operations, and emissions from the Cooling Water Tower via mist loss (due to dissolved radionuclides in the cooling water);
- Building 53: Emissions from laboratory operations;
- Building 65: Emissions from thorium repackaging operations;
- Building 71: Emissions from material sorting and repackaging operations;
- Building 78: Emissions from repackaging operations;
- Other sources: Fugitive emissions from the Waste Pit Remedial Action Project (WPRAP), and the Soil Characterization and Excavation Project (SCEP), generated via wind erosion and earth moving equipment and material handling operations;

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SECTION II: AIR EMISSIONS DATA

Tables 1 and 2 list the monitoring status, control equipment information, and the distance and direction to the nearest receptor for the point and grouped point sources at the FEMP. Table 3 lists the annual quantities (in Curies) of Point Source radionuclides likely to contribute to more than 10% of the effective dose equivalent (EDE) from the specific source.

Table 4 identifies the FEMPs non-point sources and lists the annual quantities of radionuclides likely to contribute to more than 10% of the EDE from those sources.

Particulate samples were collected from monitored stacks via isokinetic samplers. Due to the high efficiency of the HEPA filters, the amount of particulate sample collected from each stack was small. Composite samples were generated from these filters for each stack and analyzed for those radionuclides likely to contribute to more than 10% of the EDE.

For unmonitored sources, engineering calculations were used to develop estimates of total uranium emissions. The total uranium emission estimates were used to calculate radionuclide-specific emission rates, using radionuclide-specific activity to mass total uranium values (Ci/kg U) developed from past source sampling activities at the FEMP.

SECTION III: DOSE ASSESSMENT

A. Description of Dose Model

1. Dose Model

The radionuclide dose calculations were performed using the CAP88-PC Version 1.0 computer code. This package contains the AIRDOS-EPA (Mo79) computer code, which implements a steady-state, Gaussian plume, atmospheric dispersion model to calculate environmental concentrations of released radionuclides, and U. S. Nuclear Regulatory Commission Regulatory Guide 1.109 food chain models to calculate human exposures, both internal and external, to radionuclides deposited in the environment. The human exposure values are then used by the DARTAB computer code to calculate radiation doses to man from radionuclides released during the year. The dose calculations use dose conversion factors found in the RADRISK data file provided with the CAP88-PC package.

2. Maximally Exposed Individual

Estimates of the EDE from each FEMP source were made at the locations of forty (40) off-site receptors surrounding the FEMP. The maximally exposed individual (MEI) was determined to be an individual at the receptor location with the highest collective EDE.

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B. Summary of Input Parameters

Unless otherwise discussed, the input parameter values used were the default values provided with the CAP88-PC computer codes and databases by the EPA.

1. Source Data

Source information was gathered from site records, and is provided in the attached CAP88-PC Synopsis files. All point source emissions occur at or near ambient temperatures; plume rise is momentum dominated. Source to receptor distances were calculated using information from site maps using Ohio State Planar Coordinate System coordinates.

2. Meteorological Data

Meteorological data was obtained from the on-site FEMP meteorological station. The temperature sensors used to determine delta-T values, which in turn, are used to determine stabilities, were operable for less than 90% of the time during CY-1996. In order to meet the regulatory completeness requirement of 90%, as given in Section 5.3.2 of the On-Site Meteorological Program Guidance for Regulatory Modeling Applications, stability categories were determined using the lateral turbulence and wind speed method outlined in section 6.4.4.3, also found in the meteorological program guidance. Using this alternative procedure, the CY-1996 data recovery rate was 94%, considered acceptable for running the CAP88-PC code. Wind speed and direction data were compiled in a Statistical Array (STAR) format and converted using the GETWIND utility provided with the CAP88-PC package. The STAR formatted data is provided in Table 5. Additional site station data includes:

Annual Average Temperature:	48.5°F (9.18°C)
Annual Rainfall:	58.64 in. (149.0 cm)

An estimate for the average mixing height for the FEMP site was obtained from the book *Potential for Urban Air Pollution Throughout the Contiguous United States*, by George Holzworth. This estimate was:

Annual Average Mixing Height: 950 meters

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3. Other Input Parameters

The CAP88-PC code provides dose estimates from radionuclides ingested. Beef, milk, and food crop production were assumed to be the maximum possible for the available ground area, an assumption that overstates these activities in the area. It was further assumed that 100% of the foodstuffs consumed by the local population were grown within the 80 km/50 mi radius, which also provides a conservative estimate for the impact. The default values used were:

Fraction of foodstuffs	<u>Local Area</u>	<u>50-mile radius</u>	<u>Beyond 50 miles</u>
Vegetables &	0.700	0.300	0.00
Meat:	0.442	0.558	0.00
Milk:	0.399	0.601	0.00

C. Compliance Assessment

The results of the CAP88-PC modeling are summarized in Table 6. For CY-1996, the dose from point sources to the MEI is estimated to have been 4.6E-02 mrem (4.6E-04 mSv). The total estimated dose received by the MEI for CY-1996 is 6.6E-01 mrem (6.6E-03 mSv). This individual is located 1129 meters north-northeast of the center of the FEMP.

These results indicate that, during CY-1996, the FEMP was in compliance with the 10 mrem dose limitation of 40 CFR 61, Subpart H.

SECTION IV: ADDITIONAL INFORMATION

A. Construction/Modifications at the FEMP

No projects were completed in CY-1996 for which the requirements to apply to the EPA for approval to construct or modify were waived due to the provisions of 40 CFR 61.96.

B. Unplanned Releases of Radionuclides

For CY-1996, a review of the 333 notifications received by the site's release evaluators yielded one possible occurrence of an unplanned radionuclide release. While working in Plant 1 it was discovered that the filter seals in three portable HEPA filters were broken and two of those units had a breach of the filter media. The exact quantity of radionuclides that may have been released is uncertain. However, any significant quantity would have been detected via the general area monitoring for Plant 1 and would be included in the estimated release from Plant 1 demolition activities.

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C. Diffuse Sources - Dose assessment

In CY-1996 there were twelve (12) diffuse emission sources at the FEMP. These sources are listed in Table 4. Engineering calculations were used to develop estimates of total uranium emissions. The total uranium emission estimates were used to calculate radionuclide-specific emission rates, using radionuclide-specific activity to mass total uranium values (Ci/kg U) developed from past source sampling activities at the FEMP. These emission rates were used to estimate EDEs to offsite receptors and are listed in Table 6. Descriptions of the diffuse sources are provided below.

- (1) PLANT 1 - Emissions generated from dusts and materials encountered while removing equipment and partially dismantling the building. Data from four ambient air monitoring stations were used to determine the average airborne radionuclide activity due to Plant 1 cleanup operations. This activity, along with the average annual wind speed, duration of the cleanup operations, and an estimated plane of dispersion were used to estimate the amount of Uranium released. It was assumed that all of the activity in the Plant 1 monitors was due only to Uranium.
- (2) PLANT 4 - Emissions generated from dusts and materials encountered while removing equipment, partially dismantling, and imploding the building. Emissions were estimated in a manner similar to that of Plant 1, except data from seven air monitoring stations was used instead of four.
- (3) PLANT 5 - Fugitive emissions were generated from indoor material processing activities. Fugitive emissions were calculated from room area sampler air quality data. Although the activity measured is total alpha, for calculation purposes, this activity was assumed to come entirely from Uranium. The area sampler data was used to determine the percent of the Derived Air Concentration (DAC) value for Uranium. This value was used to estimate an amount of Uranium released from the building. It was assumed that the indoor air was released to the ambient air at the rate of 1 turnover of the building volume per hour.
- (4) PLANT 6 - Fugitive emissions were generated from indoor material processing activities. Emissions were estimated in a manner similar to that of Plant 5.
- (5) PLANT 8 - Fugitive emissions were generated from indoor material processing activities. Emissions were estimated in a manner similar to that of Plant 5 except the indoor air was released through two building vents. The capacity of the vent fans was used to estimate the volume of air released from the building.

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- (6) COOLING WATER TOWER - Due to the large diameter of the cell fans, emissions from the cooling water tower are assumed to be fugitive in nature. Estimates of cooling water loss were made using emission factors found in AP-42, Section 13.4-4, Table 13.4-1. It was assumed that the uranium loss was proportional to the uranium concentration in the water.
- (7) BUILDING 65 - Fugitive emissions were generated from indoor material handling activities. Emissions were estimated in a manner similar to that of Plant 5 with three exceptions. First, since the major radionuclide of concern in Building 65 is thorium, the %DAC for thorium was used instead of that of uranium. Second, the ratio of radionuclides to that of Th-232 was used instead of the site data which uses total uranium (this data was developed through the RadDecay, Version 3 computer program and is based on the amount of Th-232 originally stored at the FEMP). And third, the indoor air was released through eight HEPA filters operating at 2,000 cfm each.
- (8) BUILDING 71 - Fugitive emissions were generated from indoor material processing activities. Emissions were estimated in a manner similar to that of Plant 5.
- (9) BUILDING 78 - Fugitive emissions were generated from indoor material processing activities. Emissions were estimated in a manner similar to that of Plant 5.
- (10) SOIL CHARACTERIZATION AND EXCAVATION PROJECT (SCEP) - This project involves grading, scraping, and bulldozing of several acres of land. This work also created soil storage piles and entailed soil loading and unloading operations. Fugitive emissions were generated via wind erosion of barren areas, vehicle traffic, and material handling activities. Estimates of fugitive dust emissions were made using equations available in AP-42 and the State of Ohio's Reasonably Available Control Measures for Fugitive Dust Sources (RACM) manual. Soil concentrations of uranium were used to estimate the amount of uranium released in the dust emissions.
- (11) WASTE PIT REMEDIATION ACTION PROJECT (WPRAP) - Railyard - The activities for this project were similar to that of the SCEP. Emissions were estimated in a likewise manner.
- (12) WASTE PIT REMEDIATION ACTION PROJECT (WPRAP) - Site Improvements - The activities for this project were similar to that of the SCEP. Emissions were estimated in a likewise manner.

The estimated dose received by the MEI from the twelve sources described above was $6.1\text{E-}01$ mrem ($6.1\text{E-}3$ mSv). The location of this individual was also 1129 meters north north-east of the center of the FEMP.

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SECTION V: CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. (see 18 U.S.C. 1001).

Name: GLENN GRIFFITHS

Signature: Glenn Griffiths Date: 6-19-97

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TABLE 1: POINT SOURCES

POINT SOURCE	MONITORED STACK ? (YES/NO)	TYPE CONTROL	CONTROL EFFICIENCY	DISTANCE & DIRECTION FROM SOURCE TO NEAREST RECEPTOR
PLANT 8: Oliver Filter	NO	NONE	N/A	969m WSW
BUILDING 11: Laundry Dryer Exhaust Respirator Wash. Facility	YES NO	HEPA HEPA	99.97% 99.97%	1016m WSW 1017m WSW
BUILDING 71: Process vent	YES	HEPA	99.97%	944m N

TABLE 2: GROUPED SOURCES

GROUPED SOURCES	MONITORED STACK ? (YES/NO)	TYPE OF CONTROL	CONTROL EFFICIENCY	DISTANCE & DIRECTION FROM SOURCE TO NEAREST RECEPTOR
PLANT 6: Process vents (2)	NO	HEPA	99.97%	854m ESE
PLANT 8: Eimco Filters(2)	NO	NONE	N/A	947m WSW
BUILDING 15: Perchloric Stacks (12 hoods) HEPA Exhaust (32 hoods) General Exhaust (101 hoods)	NO YES NO	NONE HEPA NONE	N/A 99.97% N/A	921m WSW 921m WSW 921m WSW
BUILDING 20: Water Plant Lab (2 hoods)	NO	NONE	N/A	858m N
BUILDING 53: Bio-Assay/Low-Level Lab (6 hoods)	NO	NONE	N/A	939m ESE

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TABLE 3: POINT SOURCE RADIONUCLIDES

POINT SOURCE	U-234 (Ci)	U-235 (Ci)	U-236 (Ci)	U-238 (Ci)	Ra-226 (Ci)	Ra-228 (Ci)	Th-228 (Ci)	Th-230 (Ci)	Th-232 (Ci)	Th-234 (Ci)
PLANT 6: Process vents (2)	1.446E-05	7.651E-07	5.617E-07	1.615E-05	1.027E-08	4.116E-08	4.343E-07	1.278E-06	6.827E-08	6.387E-05
PLANT 8: Oliver Filter	9.39E-05	5.03E-06	3.44E-06	1.24E-04	8.41E-08	3.37E-07	3.56E-06	2.50E-07	5.59E-07	5.23E-04
Eimco Filters (2 filters)	3.30E-05	1.77E-06	1.21E-06	4.36E-05	2.95E-08	1.18E-07	1.25E-06	8.77E-08	1.96E-07	1.84E-04
BUILDING 11: Laundry Dryer Exhaust	2.40E-08	2.88E-09	2.88E-09	2.24E-08	8.63E-12	3.46E-11	2.32E-08	7.65E-08	2.08E-08	5.37E-08
Respirator Wash. Facility	6.97E-07	3.69E-08	2.71E-08	7.79E-07	4.95E-10	1.98E-09	2.09E-08	6.16E-08	3.29E-09	3.08E-06
BUILDING 15: Perchloric Stacks (12 hoods)	8.66E-05	4.58E-06	3.36E-06	9.67E-05	6.15E-08	2.47E-07	2.60E-06	7.66E-06	4.09E-07	3.83E-04
HEPA Exhaust (32 hoods)	8.37E-08	1.30E-08	1.30E-08	1.60E-07	1.14E-10	4.56E-10	1.94E-08	6.73E-08	9.58E-09	7.07E-07
General Exhaust (101 hoods)	5.93E-06	3.14E-07	2.30E-07	6.62E-06	4.21E-09	1.69E-08	1.78E-07	5.24E-07	2.80E-08	2.62E-05
BUILDING 20: Water Plant Lab (2 hoods)	2.79E-09	1.50E-10	1.02E-10	3.69E-09	2.50E-12	1.00E-11	1.06E-10	7.43E-12	1.66E-11	1.56E-08
BUILDING 53: Bio-Assay/Low-Level Lab (6 hoods)	1.64E-08	8.69E-10	6.38E-10	1.83E-08	1.17E-11	4.68E-11	4.93E-10	1.45E-09	7.76E-11	7.25E-08
BUILDING 71: Process vent	5.10E-06	2.70E-07	1.98E-07	5.69E-06	3.62E-09	1.45E-08	1.53E-07	4.51E-07	2.41E-08	2.25E-05
TOTALS	2.40E-04	1.28E-05	9.04E-06	2.94E-04	1.94E-07	7.77E-07	8.24E-06	1.05E-05	1.32E-06	1.21E-03

NOTE: To convert from Curies to Becquerels, use $1 \text{ Ci} = 3.7 \times 10^{10} \text{ Bq}$.

TABLE 4: NON-POINT SOURCE RADIONUCLIDE

NON-POINT SOURCE	U-234 (Ci)	U-235 (Ci)	U-236 (Ci)	U-238 (Ci)	Ra-226 (Ci)	Ra-228 (Ci)	Th-228 (Ci)	Th-230 (Ci)	Th-232 (Ci)	Th-234 (Ci)
PLANT 1: Demolition (Preparation)	4.09E-05	2.16E-06	1.59E-06	4.57E-05	2.90E-08	1.16E-07	1.23E-06	3.62E-06	1.93E-07	1.81E-04
PLANT 4: Demolition (Implosion)	1.58E-04	8.36E-06	6.14E-06	1.76E-04	1.12E-07	4.50E-07	4.75E-06	1.40E-05	7.46E-07	6.98E-04
PLANT 5: Material processing	2.209E-05	1.169E-06	8.582E-07	2.468E-05	1.568E-08	6.289E-08	6.636E-07	1.953E-06	1.043E-07	9.758E-05
PLANT 6: Material processing	7.031E-05	3.720E-06	2.731E-06	7.855E-05	4.992E-08	2.001E-07	2.112E-06	6.216E-06	3.320E-07	3.106E-04
PLANT 8: Fugitive Emissions	5.46E-06	2.93E-07	2.00E-07	7.22E-06	4.89E-09	1.96E-08	2.07E-07	1.45E-08	3.25E-08	3.04E-05
BUILDING 20: Cooling Water Tower	2.265E-08	1.214E-09	8.295E-10	2.994E-08	2.208E-11	8.133E-11	8.582E-10	6.028E-11	1.349E-10	1.262E-07
BUILDING 65: Fugitive Emissions	----	----	----	----	----	2.724E-06	2.701E-06	----	2.763E-06	----
BUILDING 71: Fugitive Emissions	6.04E-06	3.20E-07	2.35E-07	6.75E-06	4.29E-09	1.72E-08	1.81E-07	5.34E-07	2.85E-08	2.67E-05
BUILDING 78: Fugitive Emissions	9.276E-07	4.908E-08	3.064E-08	1.036E-06	6.586E-10	2.641E-09	2.787E-08	8.201E-08	4.380E-09	4.098E-06
SCEP: Area 1, Phase 1	3.88E-04	2.05E-05	1.51E-05	4.34E-04	2.76E-07	1.11E-06	1.17E-05	3.43E-05	1.83E-06	1.71E-03
WPRAP: Railyard	4.48E-04	2.37E-05	1.74E-05	5.00E-04	3.18E-07	1.28E-06	1.35E-05	3.96E-05	2.12E-06	1.98E-03
WPRAP: Site Improvements	8.96E-05	4.74E-06	3.48E-06	1.00E-04	6.36E-08	2.55E-07	2.69E-06	7.92E-06	4.23E-07	3.96E-04
TOTALS	1.23E-03	6.50E-05	4.78E-05	1.37E-03	8.74E-07	6.24E-06	3.98E-05	1.08E-04	8.58E-06	5.44E-03
ADDITIONAL RADIONUCLIDES	Ac-228 (Ci)	Bi-212 (Ci)	Pb-212 (Ci)	Po-212 (Ci)	Po-216 (Ci)	Ra-224 (Ci)	Tl-208 (Ci)			
BUILDING 65: Fugitive Emissions	2.724E-06	2.701E-06	2.701E-06	1.728E-06	2.701E-06	2.701E-06	9.729E-07			
TOTALS	2.724E-06	2.701E-06	2.701E-06	1.728E-06	2.701E-06	2.701E-06	9.729E-07			

NOTE: To convert from Curies to Becquerels, use 1 Ci = 3.7×10^{10} Bq.

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TABLE 5: CY-1996 STAR FORMAT METEOROLOGICAL FILE

N A 0.001690.001810.000000.000000.000000.000000	N D 0.003500.007610.009910.003140.000000.000000
NNE A 0.001810.001450.000000.000000.000000.000000	NNE D 0.003380.012810.010990.003740.000000.000000
NE A 0.002420.001690.000000.000000.000000.000000	NE D 0.005070.018720.009910.001690.000000.000000
ENE A 0.003380.000970.000000.000000.000000.000000	ENE D 0.010270.024160.009540.000120.000000.000000
E A 0.004350.001090.000000.000000.000000.000000	E D 0.011110.005320.000970.000000.000000.000000
ESE A 0.002540.001210.000000.000000.000000.000000	ESE D 0.004950.001090.001090.000000.000000.000000
SE A 0.003140.000850.000000.000000.000000.000000	SE D 0.005560.002660.001210.000000.000000.000000
SSE A 0.002420.001450.000000.000000.000000.000000	SSE D 0.005190.005680.006890.001210.000120.000000
S A 0.003020.001690.000000.000000.000000.000000	S D 0.006280.010630.018480.003870.000000.000000
SSW A 0.002540.004230.000000.000000.000000.000000	SSW D 0.010030.011480.024890.003620.000000.000000
SW A 0.003620.004110.000000.000000.000000.000000	SW D 0.014620.007130.013170.001450.000000.000000
WSW A 0.003620.002660.000000.000000.000000.000000	WSW D 0.014380.008940.010990.003620.000000.000000
W A 0.003020.002170.000000.000000.000000.000000	W D 0.013050.010630.018360.004110.000000.000000
WNW A 0.001690.000360.000000.000000.000000.000000	WNW D 0.010150.014500.020170.003380.000000.000000
NW A 0.002170.000600.000000.000000.000000.000000	NW D 0.011960.011110.010750.000480.000000.000000
NNW A 0.002050.001090.000000.000000.000000.000000	NNW D 0.010150.005920.008460.001090.000000.000000
N B 0.001210.000600.001450.000480.000000.000000	N E 0.003990.001330.000000.000000.000000.000000
NNE B 0.000240.000360.000360.000000.000000.000000	NNE E 0.002540.000480.000120.000000.000000.000000
NE B 0.000600.000120.002420.000120.000000.000000	NE E 0.002050.000720.000000.000000.000000.000000
ENE B 0.000360.000720.001450.000000.000000.000000	ENE E 0.003870.001570.000000.000000.000000.000000
E B 0.001090.000600.000480.000000.000000.000000	E E 0.005800.000360.000000.000000.000000.000000
ESE B 0.001450.000480.000240.000000.000000.000000	ESE E 0.003500.000240.000000.000000.000000.000000
SE B 0.001450.000120.000360.000000.000000.000000	SE E 0.003140.000480.000000.000000.000000.000000
SSE B 0.000600.000850.000360.000000.000000.000000	SSE E 0.003020.001690.000000.000000.000000.000000
S B 0.000850.000970.001690.000360.000000.000000	S E 0.004350.003140.000120.000000.000000.000000
SSW B 0.000720.001570.003140.000850.000000.000000	SSW E 0.009540.005680.000000.000000.000000.000000
SW B 0.002420.002050.002300.000120.000000.000000	SW E 0.013650.006520.000000.000000.000000.000000
WSW B 0.000850.001810.002660.000480.000000.000000	WSW E 0.013890.003740.000000.000000.000000.000000
W B 0.000600.001210.002170.000120.000000.000000	W E 0.013170.004110.000000.000000.000000.000000
WNW B 0.000600.000600.001690.000720.000000.000000	WNW E 0.009780.002660.000000.000000.000000.000000
NW B 0.000600.000720.002050.000120.000000.000000	NW E 0.007370.003620.000000.000000.000000.000000
NNW B 0.000240.000480.002050.000000.000000.000000	NNW E 0.005440.000480.000120.000000.000000.000000
N C 0.000360.002900.001570.000240.000000.000000	N F 0.002660.000970.000000.000000.000000.000000
NNE C 0.000240.001810.000970.000120.000000.000000	NNE F 0.002300.000600.000000.000000.000000.000000
NE C 0.000240.002540.001690.000120.000000.000000	NE F 0.002050.000120.000000.000000.000000.000000
ENE C 0.000970.004950.003260.000000.000000.000000	ENE F 0.004950.000000.000000.000000.000000.000000
E C 0.001810.004350.000970.000120.000000.000000	E F 0.003990.000120.000000.000000.000000.000000
ESE C 0.000970.002420.000240.000000.000000.000000	ESE F 0.004110.000000.000000.000000.000000.000000
SE C 0.001090.004230.000720.000000.000000.000000	SE F 0.003500.000120.000000.000000.000000.000000
SSE C 0.001090.004710.000850.000000.000000.000000	SSE F 0.003870.000600.000000.000000.000000.000000
S C 0.002420.006890.002170.000480.000000.000000	S F 0.004590.000720.000000.000000.000000.000000
SSW C 0.001810.012200.003380.000600.000000.000000	SSW F 0.007490.002050.000000.000000.000000.000000
SW C 0.001330.009300.002540.000000.000000.000000	SW F 0.007370.004470.000000.000000.000000.000000
WSW C 0.002300.007730.002420.000970.000000.000000	WSW F 0.007010.001210.000000.000000.000000.000000
W C 0.002300.006520.003140.000600.000000.000000	W F 0.006890.000970.000000.000000.000000.000000
WNW C 0.000480.005190.002540.000240.000000.000000	WNW F 0.006160.000970.000000.000000.000000.000000
NW C 0.000480.004230.002900.000120.000000.000000	NW F 0.004830.000480.000000.000000.000000.000000
NNW C 0.000850.002900.001930.000000.000000.000000	NNW F 0.003740.000480.000000.000000.000000.000000

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

40 CFR 61, SUBPART H
CY-1996 ANNUAL COMPLIANCE REPORT
TABLES

CAP88-PC File: WEATHER DATA - 96-2025-G1

NON-RADON INDIVIDUAL ASSESSMENTS

SYNOPSIS REPORTS

DOSE AND RISK
EQUIVALENT SUMMARIES

96-2025-G1	96-General-G1	96-2025-G1	96-General-G1
96-2025-G2	96-General-G2	96-2025-G2	96-General-G2
96-2020-G1	96-Z010-G1	96-2020-G1	96-Z010-G1
96-2020-G2	96-Z010-G2	96-2020-G2	96-Z010-G2
96-Z032-G1	96-Cool-G1	96-Z032-G1	96-Cool-G1
96-Z032-G2	96-Cool-G2	96-Z032-G2	96-Cool-G2
96-2022-Vent-G1	96-Bio/LL-G1	96-2022-Vent-G1	96-Bio/LL-G1
96-2022-Vent-G2	96-Bio/LL-G2	96-2022-Vent-G2	96-Bio/LL-G2
96-2022-Fugi-G1	96-Z024-G1	96-2022-Fugi-G1	96-Z024-G1
96-2022-Fugi-G2	96-Z024-G2	96-2022-Fugi-G2	96-Z024-G2
96-Oliver-G1	96-B71-Vent-G1	96-Oliver-G1	96-B71-Vent-G1
96-Oliver-G2	96-B71-Vent-G2	96-Oliver-G2	96-B71-Vent-G2
96-Eimcos-G1	96-B71-Fugi-G1	96-Eimcos-G1	96-B71-Fugi-G1
96-Eimcos-G2	96-B71-Fugi-G2	96-Eimcos-G2	96-B71-Fugi-G2
96-Z019-G1	96-Z031-G1	96-Z019-G1	96-Z031-G1
96-Z019-G2	96-Z031-G2	96-Z019-G2	96-Z031-G2
96-Laundry-G1	96-SCEP-G1	96-Laundry-G1	96-SCEP-G1
96-Laundry-G2	96-SCEP-G2	96-Laundry-G2	96-SCEP-G2
96-RWF-G1	96-WPRAP-RR-G1	96-RWF-G1	96-WPRAP-RR-G1
96-RWF-G2	96-WPRAP-RR-G2	96-RWF-G2	96-WPRAP-RR-G2
96-Perc-G1	96-WPRAP-S-G1	96-Perc-G1	96-WPRAP-S-G1
96-Perc-G2	96-WPRAP-S-G2	96-Perc-G2	96-WPRAP-S-G2
96-HEPA-G1		96-HEPA-G1	
96-HEPA-G2		96-HEPA-G2	

NOTES: (1) The CAP88-PC files listed above have either a G1 or G2 designation. The G1 designation corresponds to receptors 1 through 20. The G2 designation corresponds to receptors 21 through 32 and A through H.

(2) The DOSE AND RISK EQUIVALENT SUMMARIES contain tables of Individual Effective Equivalent Dose Rates. Proceeding from left to right in the tables on pages 5 and 6 in the DOSE AND RISK EQUIVALENT SUMMARIES, the highlighted numbers correspond to receptors 1-20 for the G1 files, and receptors 21-32 and A-H for the G2 files. The highlighted numbers have been tabulated in Table 6 of the annual report.

(3) The distance and direction given for the highlighted EDE corresponds to the receptor's distance and direction from the source.